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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,463	05/24/2001	Gregory J. Wilson	291958157US3	4951
25096	7590	10/17/2005	EXAMINER	
PERKINS COIE LLP			WILKINS III, HARRY D	
PATENT-SEA			ART UNIT	
P.O. BOX 1247			PAPER NUMBER	
SEATTLE, WA 98111-1247			1742	

DATE MAILED: 10/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/866,463

Applicant(s)

WILSON ET AL.

Examiner

Harry D. Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 23-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 23-40 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/8/04, 9/28/04, 12/10/04
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

Allowable Subject Matter

1. Prosecution on the merits of this application is reopened on claims 1-14 and 36-40 considered unpatentable for the reasons indicated below.

Priority

2. The present application claims priority to several prior applications. Portions of the present invention appear in the prior applications while others do not. Particularly, the first instance in the chain of priority that discloses a controller as claimed in claims 1 and 23, is in 09/849,505, filed 4 May 2001. Claim 37 however, finds support in PCT/US00/10120, filed 13 April 2000 and also in 60/129,055, filed 13 April 1999. Thus, claims 1-14 and 23-36 have been granted an effective filing date of 4 May 2001 and claims 37-40 have been granted an effective filing date of 13 April 1999. If Applicant disagrees with any of the asserted filing dates, the Examiner would appreciate assistance in determining the proper effective filing dates.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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4. Claims 1-6, 10 and 12-14 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Wang (US 6,391,166).

Wang anticipates the invention as claimed. Wang teaches (see figures 3A and 3B and col. 3, lines 39-42) a processing container including a principal fluid flow chamber, a plurality of concentric anodes disposed in the principal fluid flow chamber being independently coupled to a power supply and a controller operatively coupled to the concentric anodes to cause individual control of the current flowing to each of the different anodes.

Regarding claim 2, the plurality of concentric anodes were (see figures 3A and 3B) contained within dielectric compartments.

Regarding claim 3, the principal fluid flow chamber is defined (see figures 3A and 3B) by a curved outer sidewall.

Regarding claims 4 and 5, Wang teaches (see figure 17) that each of the dielectric compartments had lateral projections at an upper end of the compartments, the anode being housed in the compartment, and the lateral projection shielding the workpiece from the anode to define a plurality of concentric virtual anodes. The virtual anode included a housing having an inlet (bottom) and an outlet (top) disposed in close proximity to the wafer and an anode in the housing.

Regarding claim 6, although not expressly taught by Wang, the anodes would have considered to inherently have been made from non-consumable material (i.e.-inert) because the copper ions to be plated were added to the electrolyte in the chamber

36.

Regarding claim 10, the controller of Wang would inherently contain an optimization subsystem for selecting the currents delivered through the anodes by the controller because the automated PC controller of Wang would have been set up to perform routine experimentation on the apparatus to determine optimal currents.

Regarding claim 12, Wang teaches a pump 33 to circulate the electrolyte.

Regarding claim 13, the chamber of Wang included an electrolyte solution to electroplate copper onto the wafer.

Regarding claim 14, this claim is merely related to the manner of operating the claimed apparatus. Hence, since the prior art apparatus was capable of operating in the claimed fashion, Wang clearly anticipates this claim. See MPEP 2114.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang (US 6,391,116).

Regarding claim 11, it would have been obvious to one of ordinary skill in the art to have stored the optimization data in any conventional logic table/matrix, such as a Jacobian matrix.

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7. Claims 23-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang (US 6,391,116) in view of Zila et al (US 5,731,678) and Lublin et al (US 3,984,679).

The teachings of Wang are described above. Wang further teaches (see abstract) using a wafer chuck to hold the workpiece. The control system controlled at least one electrical power parameter for a given anode based on user input parameters.

Thus, Wang fails to expressly teach that the workpiece holder included one or more electrical contacts connected to electrically contact the surface of the workpiece.

Zila et al teach (see figures and abstract) a conventional wafer chuck for holding a wafer workpiece during electroplating that included a plurality of contact fingers for making electrical contact to the wafer.

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the conventional wafer chuck of Zila et al as the wafer chuck of Wang because the conventional wafer chuck had the advantage of easily providing current to the wafer surface while simultaneously holding the wafer in position.

Further, Wang fails to teach that the control system compensates the electrical power parameter by a predetermined sensitivity value.

Lublin et al teach (see abstract and col. 6, lines 24-54) that it was known in the art of electroplating to compensate for errors in electroplating by using a sensitivity error correction parameter.

Therefore, it would have been obvious to one of ordinary skill in the art to have added the ability to control the electrical parameter based on the sensitivity correction

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parameter as taught by Lublin et al to the control system of Wang because by adding the sensitivity correction parameter, more accurate control of electroplating could have been achieved.

Regarding claim 24, Wang varies the electrical current flowing to each of the anodes.

Regarding claim 25, it would have been obvious to one of ordinary skill in the art to have stored the sensitivity correction parameter data in any conventional logic table/matrix, such as a Jacobian matrix.

Regarding claim 26, Lublin et al teaches control of the thickness of the electroplated layer.

Regarding claims 27 and 32, Wang teaches (see figures) that all of the anodes were placed at the same distance away from the wafer surface. However, it would have been obvious to one of ordinary skill in the art to have positioned each of the anodes at varying distances from the wafer surface in order to add further control of the electric field at the wafer surface. Arranging the outermost anode closest to the wafer and the centermost anode furthest from the wafer would have been obvious under this rationale.

Regarding claim 29, since the multiple anodes are disposed at different locations throughout the principal fluid flow chamber, they would inherently be considered to be disposed at the same "effective" distances from the surface of the wafer.

Regarding claims 28, 30 and 31, the anodes of Wang were arranged concentrically.

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Regarding claims 33 and 34, as above, Wang teaches (see figure 17) using virtual anodes. The virtual anode included a housing having a fluid inlet (bottom) a fluid outlet (top) in close proximity to the wafer and an anode (conductive element) being disposed in the housing.

Regarding claim 35, although not expressly taught by Wang, the anodes would have considered to have been made from non-consumable material (i.e.-inert) because the copper ions to be plated were added to the electrolyte in the chamber 36.

8. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson et al (WO 00/61498 or WO 00/61837) in view of Wang (US 6,391,116).

Wilson et al clearly teach (see abstract and figures) the claimed reactor.

However, Wilson et al do not teach the claimed control system.

Wang teaches a similar reactor system using multiple concentric anodes, wherein the reactor system included a controller wherein the current (electrical power parameter) was individually controlled to each anode based on user input parameters.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a controller to the apparatus of Wilson et al as taught by Wang in order to achieve more accurate control of the electroplating process.

Regarding claims 2-9 and 12-14, Wilson et al clearly teaches (see figures) each of these limitations.

Regarding claims 10 and 11, the controller of Wang would inherently contain an optimization subsystem for selecting the currents delivered through the anodes by the controller because the automated PC controller of Wang would have been set up to

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perform routine experimentation on the apparatus to determine optimal currents. It would have been obvious to one of ordinary skill in the art to have stored the sensitivity correction parameter data in any conventional logic table/matrix, such as a Jacobian matrix.

9. Claims 23-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson et al (WO 00/61498 or WO 00/61837) in view of Wang (US 6,391,116) and Lublin et al (US 3,984,679).

Wilson et al clearly teach (see abstract and figures) the claimed reactor.

However, Wilson et al do not teach the claimed control system.

Wang teaches a similar reactor system using multiple concentric anodes, wherein the reactor system included a control system wherein the current (electrical power parameter) was individually controlled to each anode based on user input parameters.

Lublin et al teach (see abstract and col. 6, lines 24-54) that it was known in the art of electroplating to compensate for errors in electroplating by using a sensitivity error correction parameter.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a control system to the apparatus of Wilson et al as taught by Wang and Lublin et al in order to achieve more accurate control of the electroplating process.

Regarding claim 25, it would have been obvious to one of ordinary skill in the art to have stored the sensitivity correction parameter data in any conventional logic table/matrix, such as a Jacobian matrix.

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Regarding claim 26, Lublin et al teaches control of the thickness of the electroplated layer.

Regarding claims 27-36, Wilson et al clearly teaches (see figures) each of these limitations.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 37-40 are rejected under the judicially created doctrine of obviousness-

type double patenting as being unpatentable over claims 10-13 of U.S. Patent No.

6,569,297 in view of Wang and Zila et al. Claim 10 of the '297 patent contains the same

language as the present claim, except claim 10 does not recite the "one or more

electrical contacts" and the "plurality of individually operable electrical conductors".

However, it would have been obvious to one of ordinary skill in the art to have

incorporated a plurality of individually operable electrical conductors as taught by Wang

(see teachings above) for the purpose of achieving more accurate control of the electric

field and to have used the conventional wafer chuck as taught by Zila et al which

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included multiple contacts disposed on the workpiece support to make electrical contact with the wafer because the conventional wafer chuck had the advantage of easily providing current to the wafer surface while simultaneously holding the wafer in position.

12. Claims 37, 39 and 40 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 10, 16, 17 of U.S. Patent No. 6,660,137. Although the conflicting claims are not identical, they are not patentably distinct from each other because each and every claim feature is present in claim 10 of the '137 patent. The plurality of anodes in claim 10 of the '137 patent reads on the claimed plurality of individually operable electrical conductors.

13. Claims 37-40 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 38-41 of copending Application No. 10/400,186. Although the conflicting claims are not identical, they are not patentably distinct from each other because the structure of the claimed processing container is identical to the claimed processing container in the '186 Application. The limitation of the conductors being positioned in contact with the electrolyte is not given patentable weight because it does not modify the structure of the reactor. Contact between the conductors and the electrolyte depends upon how full the container is.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

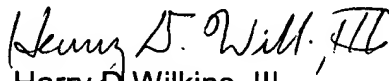
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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D. Wilkins, III
Examiner
Art Unit 1742

hdw